DOCUMENT RESUME

ED 479 452 IR 022 129

AUTHOR	Doiron, J. A. Gilles; Isaac, John R.
TITLE	Developing Online Emergency Room Case Study Role Play for Medical Students.
PUB DATE	2002-10-00
NOTE	7p.; In: E-Learn 2002 World Conference on E-Learning in Corporate, Government, Healthcare, & Higher Education. Proceedings (7th, Montreal, Quebec, Canada, October 15-19, 2002); see IR 022 093.
AVAILABLE FROM	Association for the Advancement of Computing in Education (AACE), P.O. Box 3728, Norfolk, VA 23514. Tel: 757-623-7588; e-mail: info@aace.org; Web site: http://www.aace.org/DL/.
PUB TYPE	Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01 Plus Postage. PC Not Available from EDRS
DESCRIPTORS	Case Studies; *Computer Assisted Instruction; Computer Mediated Communication; *Computer Simulation; Cooperative Learning; Decision Making; Group Discussion; Instructional Design; Learning Activities; *Medical Education; Online Systems; *Role Playing; World Wide Web

ABSTRACT

In the face of panic and life-threatening situations in a hospital emergency room (ER), doctors must rely on well-defined procedures to assess the situation and respond appropriately. Because decisions to act must not only be timely, but also ingrained and swift, practice and experience in a wide range of situations is essential. This paper outlines the analysis, design and prototype development phases of a Web-based role-play scenario in which the students of surgery can add to their repertoire of experience in ER medicine. Examples of existing online case study and role-play activities for clinical and ER training were studied. The instructional design decisions took into consideration the desirable attributes of these examples, but more importantly, addressed their shortcomings. The prototype features an interface that enables the student to make many decisions at one time while proceeding to stabilize and diagnose the patient. After completing the procedure, the student's report is posted to an online discussion site for peer analysis and critique. The development of a future prototype is also discussed. (Author)

Reproductions supplied by EDRS are the best that can be made
from the original document.

PERMISSION TO REPRODUCE AND
DISSEMINATE THIS MATERIAL IN
MICROFICHE ONLY HAS BEEN GRANTED BY

G.H. Marks

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)
2B

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)
This document has been reproduced as
received from the person or organization
originating it.
☐ Minor changes have been made to
improve reproduction quality.
• Points of view or opinions stated in this
document do not necessarily represent
official OERI position or policy.

ED 479 452

Developing Online Emergency Room Case Study Role Play For Medical Students

J.A. Gilles Doiron[1] and Dr. John R. Isaac[2]

[1]Centre for Development of Teaching & Learning
[2]Department of General Surgery Faculty of Medcine
National University of Singapore
10 Kent Ridge Crescent, Singapore, 119260

ABSTRACT

In the face of panic and life-threatening situations in a hospital emergency room (ER), doctors must rely on well-defined procedures to assess the situation and respond appropriately. Since decisions to act must not only be timely, but also ingrained and swift, practice and experience in a wide range of situations is essential. This paper outlines the analysis, design and prototype development phases of a web-based role-play scenario in which the students of surgery can add to their repertoire of experience in ER medicine. Examples of existing online case study and role-play activities for clinical and ER training were studied. The instructional design decisions took into consideration the desirable attributes of these examples, but more importantly addressed their shortcomings. The prototype features an interface that enables the student to make many decisions at one time while proceeding to stabilise and diagnose the patient. After completing the procedure, the student's report is posted to an online discussion site for peer analysis and critique. The development of a future prototype is also discussed.

KEYWORDS

online role-play, case study simulation, e-learning, web-based learning, WBL, academic emergency medicine

INTRODUCTION

In medicine, the use of information technology (IT) for teaching and learning began with the digital revolution of the early 1980s and the introduction of affordable personal computers for schools. The evolution of IT for the medical curriculum went from computer-based learning,

IR022129

BEST COPY AVAILABLE

such as the early low-graphics resolution tutorials, to computer controlled interactive videotape and videodisc, to immersive virtual reality simulations.

Today, the advent of the World Wide Web has added a new technology dimension: synchronous and asynchronous communication, and ubiquitous access. Slotte et al (2001) report that a 1999 survey showed that most medical school graduates in the USA "...used email (96%), medical information databases (92%) and the worldwide web (85%), especially for health care information". Unfortunately, as Turchin A. & Lehmann (2000) point out "...currently existing WWW-based medical educational applications seldom venture far beyond the boundaries of traditional curricula. Most of them serve as information depots, not offering significant qualitative improvement compared to a regular well-indexed textbook".

Concurrently, research and evaluation of technology in education has been examining the instructional design approaches for producing effective learning materials. Instructional design is a systematic approach to course development that ensures that specific learning goals are accomplished. Traditionally, instructional design models are based on behaviourist origins that stress the need for learning objectives, feedback and reinforcement to achieve a particular change in the learner. More progressive models of instructional design are now being fostered through a constructivist view of learning: the belief that individuals learn best from meaningful, self-directed and contextually relevant experiences. These models tend to use computer-mediated communication for peer-to-peer critique and collaborative learning activities, and have less emphasis on the teacher's role.

Bearman et al (2001) examined computer assisted instruction design approaches involving "virtual patients", where the student role-plays a doctor as he/she goes through scripted interactions with a "simulated" patient. The virtual patient design may range from the simple web-based to resource-intensive productions, but its instructional approach is either problem solving or narrative. The Interactive Patient (http://medicus.marshall.edu/medicus.htm) presenting a series of interactions over time with a coherent story line is an example of the narrative. While a repository of trauma cases (http://www.trauma.org) is an example of the problem solving approach.

Information and communication technology provides a new foundation for building what we now term as Internet enabled learning or e-learning. Looking for a feasible approach to provide a more meaningful online learning experience, the authors researched how an online role play simulation strategy, a variation of the problem solving approach in a virtual patient setting, could meet the needs of the surgical training program.

THE RATIONAL AND GOALS OF THE PROJECT

There are close to two hundred students in the fourth year of the medicine program, and ER medicine is part of their training. Students have a three-week posting to an emergency department of a teaching hospital where they receive basic cardiac life support training. They experience the management of trauma patients in the ER by observing and assisting the attending physicians. Concurrently the students take the American College of Surgeons Advanced Trauma Life Support course where in addition to attending lectures, they execute dry and wet simulationskills practice, and role-play on mock up (actors) patients.

BEST COPY AVAILABLE

Because of the number of students involved and the time allotted to role-play, each student gets very limited case simulation experience. Access to online role-play would enable each student to handle more scenarios, and even accrue some level of experience before their hospital posting. A more varied experience would translate to better management of real trauma cases during their posting.

The instructional design approach for this program reflects a pragmatic mix of strategies for teaching and learning. Our primary goal is to help the students self-assess their knowledge of related clinical procedures and laboratory tests needed to quickly stabilise and diagnose a trauma patient. While behavioural strategies are used to reinforce the basic airway, breathing and circulation (ABC) procedures critical to ER cases, constructivist learning strategies aim to encourage students to reflect on the processes involved and the experience gained. The constructivist strategies include framing the case study in a contextual experience and online discussion and debate to substantiate and compare their explanations with peers.

WHAT'S ON THE WEB NOW

An in-depth search of the World Wide Web yielded few sites dedicated to academic ER medicine. E-learning for ER medicine is not a common practice and the existing web sites have varying levels of sophistication in design. For most, the interface is limited to hyperlinked information, whether as additional data about a case or as feedback to multiple-choice questions (MCQs). None of the sites were designed to reinforce the ABC procedure for trauma cases. Some were no more than hypertext versions of print-based case studies.

Some simple case presentations can be found at Emergency Medicine Bulletin Board System (EMBBS) (http://www.embbs.com/ccc/ccc.html), including Clinical Reviews In-Depth and Academic Emergency Medicine's clinical pearls. Although they provide a convenience of access to information, these examples have no manner of learner interaction with the case. They are the equivalent to printed case studies. Others like the "CyberPatient Simulator" (http://www.mdchoice.com/cyberpt/cyber.asp) are slightly more sophisticated. Using basic web features, they present the case study as a series of decisions. As the learners proceed from one decision point to another, they get information about the case while responding to a sequence of questions. This design is linear with minimal interaction between the learner and the case. However, it still creates a presentation style where the learner can reflect on the information presented before viewing the consequences of any decision.

The Cases In Emergency Medicine web site of the University of Virginia School of Medicine (http://www.med.virginia.edu/med-ed/em/) makes use of more advanced web features. Dr. Stephen Huff has developed several web-based case simulations as scripted encounters with patients. Students progress through the case by selecting the appropriate sequence of investigation. Students get information about the case as they select to "Stabilise" the patient, get "History" and do a "Physical". Relevant questions about the case lead the student to selecting the appropriate "Action" to undertake.

This design is not only a more challenging experience to the learner, but it also features a set mode for presenting any case. Doctors can develop new cases by following the established

sequence of presentation, making it easy to script and storyboard, and easy to program. But although this template is simple to use for content experts and programmers, it provides only basic user-interaction with the case simulation. A greater fidelity to real life experience, like enabling the student to indicate how procedures are accomplished, or make multiple decisions at one time is desirable.

THE DESIGN OF THE PROTOTYPE

Although many students in the Faculty of Medicine have Internet access from their homes, very few have subscription to wide band services such as ADSL or cable-modem. Therefore so called "video over the Internet" would have to be set-up for low bandwidth delivery. Since this configuration is woefully inadequate i.e. the size of the image is small and video image freezing is common due to network congestion, the prototype would not have video sequences. As well, because of the need for greater efficiency in developing future ER role-play simulation scenarios, the prototype would serve as a template for authoring subsequent cases. To produce new cases, content experts would only need to replace content (e.g. text and photos); the sequence and the structure of interaction remain the same.

In this prototype a mentor character, the chief of ER medicine, will set the stage for the trauma case and spell out his expectations for efficient handling of the case. The student will role-play the attending physician in ER under the watchful eye of the expert. As the strategy of role-play in this ER trauma case simulation is a student centred activity, the mentor's role is to provide feedback. Rather than observing or being prompted by the mentor, students need to practice applying their knowledge of ER procedures and diagnostic investigation.

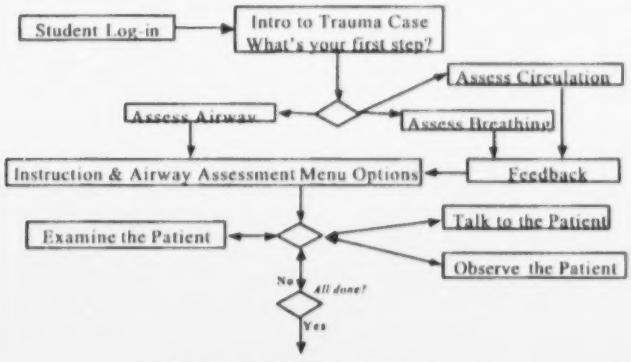

Fig. 1 Program Flowchart - Assess Airway Segment

The fundamental ABC sequence of attending to ER trauma is the first item to reinforce. Then, depending on the circumstance of the case, the attending physician (the student) must decide on which clinical and lab tests to perform at each stage of the ABC procedure. The student may also need to observe the patient or ask him some questions. These options are indicated in the program flowchart (Fig. 1). After being introduced to the case and selecting "Assess The Airway", the student can "Observe The Patient", "Talk To The Patient" or "Examine The Patient".

BEST COPY AVAILABLE

The Observe The Patient option hyperlinks to a medium close-up photo of the patient with comments on his breathing rate and alertness i.e. what would be evident if the observation were real-time or on video. The Talk To The Patient option hyperlinks to a selection of questions to ask the patient, and his response is heard as an audio file. The Examine The Patient option hyperlinks to new screen showing a clipboard with a selection of clinical tests. The student must select the appropriate tests to perform during the "Assessing The Airway" stage of the ABC procedure.

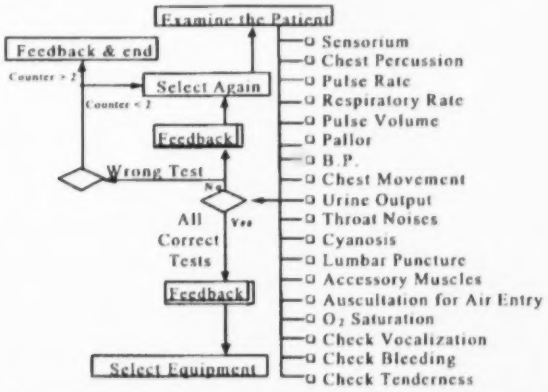

Fig. 2 Examine the Patient - Clinical Tests Flowchart

At this point the student must select all the appropriate clinical actions to perform. If some of the required actions have not been selected, the student will be asked to think t over, and complete the selection until all have been identified (see Fig. 2). If the student selects more than three clinical procedures that are not required, the simulation is terminated and the student is encouraged to study the ABC procedure before logging-on again. This aspect of the program will be examined during the prototype testing, and the number of errors allowed and the feedback messages presented will be addressed to reduce ambiguity and provide guidance for learning.

Having selected all the clinical tests to conduct, the student will then be asked to request the equipment needed to carry them out. The observations and results of clinical tests are posted in a "Clinical Notes" folder. Next the student is requested to select the appropriate laboratory tests or other investigation procedures. As in the clinical tests, in order to complete this section the student must select all the appropriate actions at this stage in the ABC procedure. Similarly, making too many inappropriate selections will terminate the simulation.

After selecting all of the appropriate lab tests and procedures such as x-rays and CT scans, the results are posted in the "Clinical Notes" folder, and the program hyperlinks to the next stage of the ABC procedure. The same interaction between the student and the program is repeated until the student has completed the "Assessing The Circulation" stage of the ABC procedure. Throughout, the Clinical Notes" folder is accessible by the student, and he/she can type comments at any time. It will therefore hold, in its sequential order, all the information gathered from observing and talking to the patient, and all the results of the procedures and

BEST COPY AVAILABLE

tests carried out. The student can use the information in this folder to support his/her diagnosis and recommendation for treatment.

The final element of this program will assign students to small online groups of 3 to 5 students. The diagnosis and recommendation for treatment that each student typed after completing the ABC procedure is automatically posted in a discussion forum type of environment, and students are asked to critique each other's findings. Since no names are shown on this site, weak or erroneous bogus reports can be inserted for the students to critique. After the students have agreed on the wording of a final report, it is emailed to the lecturer for a final review and feedback.

CONCLUSION

The development of the prototype for this case simulation role-play is underway. Formative evaluation is planned and will certainly modify, to some extent, the existing design. The goals, however, will not change. Students will experience learning in a relevant context and proceed through the ABC stages of trauma patient management. They will make decisions for stabilising and diagnosing patients in unique true-to-life cases and conclude by discussing, debating and substantiating their decisions. Students will learn to instinctively apply fundamental procedures that they will soon play out in real life.

The media selection for this prototype is based on circumventing the technology constraints of today's World Wide Web, but in the future ubiquitous access to streaming media will serve to complement and enhance the realism of the simulation. This, in fact, can be researched using our university wide-band Intranet and is expected to be featured in our next prototype design. More important is the need to examine the learning paradigm of online case simulation role-play and other student centred learning approaches. It is hoped that the implementation of a program based on this prototype will encourage research in the pedagogical implications and consequences of using this approach.

REFERENCE

Bearman, M., Cesnik, B., & Liddell, M. (2001). Random comparison of "virtual patient" models in the context of teaching clinical communication skills Medical Education. Medical Education, 35 (9), 824-834

Slotte, V., Wangel, M., & Lonka, K. (2001). Information technology in medical education: a nationwide project on the opportunities of the new technology. Medical Education, 35 (10), 990-998

Turchin A. & Lehmann C. U. (2000) Active Learning Centre: design and evaluation of an educational World Wide Web site. Medical Informatics and the Internet in Medicine, 25 (3), 195-206

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

NOTICE

Reproduction Basis

[X] This document is covered by a signed "Reproduction Release (Blanket)" form (on file within the ERIC system), encompassing all or classes of documents from its source organization and, therefore, does not require a "Specific Document" Release form.

[ ] This document is Federally-funded, or carries its own permission to reproduce, or is otherwise in the public domain and, therefore, may be reproduced by ERIC without a signed Reproduction Release form (either "Specific Document" or "Blanket").